U.S. Department
of Transportation
Federal Aviation
Administration

AC 25-8

DATE 5/2/86

ADVISORY CIRCULAR

AUXILIARY FUEL SYSTEM INSTALLATIONS

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Subject: AUXILIARY FUEL SYSTEM INSTALLATIONS

Date: 5/2/86 **AC No:** 25-8
Initiated by: ANM-110 **Change:**

1. PURPOSE. This advisory circular (AC) sets forth acceptable means, but not the only means, by which compliance may be shown with the requirements of the Federal Aviation Regulations (FAR) pertaining to the installation of auxiliary fuel systems in transport category airplanes. As with all AC material, it is not mandatory and does not constitute a regulation.

2. SCOPE. This document provides guidance and criteria for the installation of auxiliary fuel systems, i.e., those which supplement essential fuel systems to provide additional range, in transport category airplanes. It is intended primarily for installations in which the auxiliary fuel is carried within the fuselage, such as within cargo or baggage compartments, the main deck or other similar areas. Although the material presented in this AC is generally applicable to other installations that involve changes in primary structure, aerodynamics or mass distribution, such installations may require extensive additional substantiation that is beyond the scope of this AC. Similarly, additional substantiation beyond the scope of this AC would be required for essential fuel system installations. "Auxiliary" and "essential" fuel systems are defined in more detail in Appendix 1 of this AC.

3. BACKGROUND. Currently, many applications for supplemental type certificates (STC) and amended type certificates are being received by a number of the FAA aircraft certification offices for incorporation of additional fuel capacity in existing certificated airplanes. The design and safety concepts for fuel storage and transfer proposed in these applications vary considerably. In addition, some auxiliary fuel system installations are being used for control of the center of gravity (c.g.), which results in fuel usage late in the flight profile. These factors, coupled with the differing requirements that each existing airplane fuel system imposes, complicate an evaluation of the safety and airplane compatibility of the proposed installation.

4. GENERAL. Before determining the auxiliary fuel system configuration and modifying the airplane, the applicant should become familiar with the existing airplane structural and systems characteristics and functions, and with the applicable certification requirements. To avoid structural and systems compatibility problems, a working knowledge of the airplane is essential. In particular, the applicant should determine the effects of the addition of the auxiliary fuel system on payload, c.g., system and airplane operations and

structural margins. When in doubt about any certification requirement, the applicant should consult with the FAA aircraft certification office responsible for his project early in the design program to avoid possible costly changes late in theprogram.

5. CERTIFICATION BASIS.

a. New Type Certificates. For the issuance of a new type certificate, an airplane must be shown to comply with the certification basis established in accordance with § 21.17 of the Federal Aviation Regulations (FAR). If the regulations do not provide adequate or appropriate standards because of a novel or unusual design feature, special conditions may be prescribed in accordance with § 21.16.

b. Other Design Changes. For other design changes, such as the addition of a new model to an existing type certificate or modification of an existing model, the airplane must be shown to comply with the certification basis established in accordance with § 21.101. Generally, the applicant may choose compliance with the regulations incorporated by reference in the type certificate (the original certification basis) or with the applicable regulations in effect on the date of the application for approval of the auxiliary fuel system (current rules). If the original certification basis does not provide adequate or appropriate safety standards because of novel or unusual design features, compliance with current rules may be prescribed in accordance with § 21.101(b). If neither the original certification basis nor current rules provide adequate or appropriate standards, special conditions may be prescribed in accordance with § 21.16. Although sections of Part 25 are referenced in this AC, the references should be interpreted to be the corresponding sections of Part 4a or 4b of the Civil Air Regulations (CAR) when Part 4a or 4b is the original certification basis.

c. Unsafe Features or Characteristics. Notwithstanding compliance with the established certification basis, § 21.21 precludes approval if there is any feature or characteristic that makes the airplane unsafe. The applicant should recognize that it may be necessary, because of such a feature or characteristic, to impose special requirements which exceed the standards of the certification basis, to eliminate the unsafe condition.

6. PROCEDURES. In order to avoid delays and possible expensive redesign, it is strongly recommended that the following procedures be followed. The applicant should:

a. Submit a proposed overall certification plan that identifies the essential steps or actions and the sequence anticipated for submitting reports, drawings, process specifications, analyses, tests and other documentation to complete the installation approval. This program should include the proposed or target schedule for the FAA approval tests and inspections required.

b. Generate a certification test plan which describes the analytical procedures or qualification testing to be used to demonstrate the design

adequacy. Each plan should list the applicable FAR and describe how each requirement will be met. In addition, the plan should include a description of the airplane or test articles to be used, drawings, method of production simulation (if applicable), and the target date for installation and test. The certification test plan should be submitted for review and concurrence by the appropriate FAA aircraft certification office prior to initiation of tests, to prevent certification delays.

c. Obtain FAA concurrence that each certification test plan is adequate.

d. Obtain FAA conformity inspection of the test installation.

e. Schedule and conduct the ground and flight test(s) with FAA witnessing.

f. Submit a final test report describing all test results and obtain FAA approval.

LEROY A. KEITH
Manager, Aircraft Certification Division

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